Claims

What is claimed is:

1. A flow cell for transporting fluid in a radiant energy field, comprising:

(a) a cell structure having a first elongated tube disposed therein, said first tube including a radiant energy blocking portion integral therewith, and a first open channel extending therethrough, such first open channel forming a continuous passageway through said cell structure.

2. A flow cell as in Claim 1, including a first end cap that is sealingly engagable with said cell structure, said end cap having a protrusion extending at least partially into such first open channel, and a second open channel substantially aligned with such first open channel to extend the continuous passageway through said first end cap.

3. A flow cell as in Claim 1, including a second end cap disposed on, and sealingly engagable with, an opposing end of said cell structure, said second end cap having a protrusion extending at least partially into such first open channel, and a third open channel substantially aligned with such first open channel so as to extend the continuous passageway through said second end cap.

4. A flow cell as in Claim 2, including a second tube disposed substantially concentrically about said

first tube, and a third tube disposed substantially concentrically around said second tube.

5. A flow cell as in Claim 1 wherein said first tube comprises a perfluorinated copolymer.

6. A flow cell as in Claim 4 wherein said second tube comprises PEEK.

7. A flow cell as in Claim 4 wherein said third tube comprises FEP.

8. A flow cell as in Claim 1 wherein said radiant energy blocking portion is disposed along a length of said first tube.

9. A flow cell as in Claim 8 wherein said radiant energy blocking portion is spaced from an inner surface of said first tube by at least about two wavelengths of the radiant energy.

10. A flow cell as in Claim 1 wherein said radiant energy blocking portion is chemically bonded to said first tube.

11. A flow cell as in Claim 4 wherein said radiant energy blocking portion is chemically bonded to each of said first, second, and third tubes.

12. A flow cell as in Claim 1 wherein said radiant energy blocking portion is disposed at respective end surfaces of said first tube.

13. A flow cell as in Claim 1 wherein said radiant energy blocking portion includes carbon.

14. A flow cell as in Claim 2 wherein said protrusions of said first and second end caps are positioned to displace respective portions of said third layer, thereby forming a fluid-tight seal between said third layer and said protrusions.

15. A flow cell as in Claim 3 wherein said second end cap protrusion is displaced from respective ends of said layers, whereby a gap volume is formed for fluid residence therein.

16. A flow cell as in Claim 15 wherein said gap volume is calibrated such that radiant energy losses may be standardized in respective flow cells transporting fluids having various indexes of refraction.

17. A flow cell as in Claim 1 wherein said first tube is formed through a single-step extrusion process.

18. A method of determining sample composition through radiant energy interaction, comprising:

(a) providing a cell body having an open bore extending therethrough;

(b) providing one or more layers of material lining such open bore, at least one of said layers having a radiant energy blocking portion integral therewith;

(c) attaching one or more end caps to said cell body, said end caps including protrusions extending therefrom, wherein said protrusions extend at least partially into such open bore such that a fluid-tight seal is formed between said one or more material layers and said protrusion, said end caps further including one or more open channels in substantial alignment with such open bore;

(d) transporting sample fluid and radiant energy through such open bore such that the radiant energy passes through the sample fluid; and

(e) receiving and interpreting the radiant energy that has passed through the sample fluid.

19. A method as in Claim 19 wherein said radiant energy blocking portion is chemically bonded to at least one of said layers.

20. A method as in Claim 19 wherein said radiant energy blocking portion comprises carbon.